

# **Final Report and Budget Accounting**

## **“Feasibility Study for Alternative Cropping Systems for Cranberry Bogs or Uplands**

### **Part I: Dayneutral Strawberry Production”**

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### **Background - Cranberries**

Massachusetts cranberry farms are facing the biggest crisis of their history. This crisis has been well documented and will only be briefly described here. According to the August 2000 Massachusetts Cranberry Industry Briefing by First Pioneer Farm Credit, the leading lender to the Massachusetts Industry, this crisis is substantiated by the following elements:

- Massachusetts' cranberry growers collectively lost about \$50 million in 1998 and 1999 and will likely incur similar losses again in 2000.
- These losses are widespread affecting virtually all growers to some extent.
- These losses are cumulative in impact, taking affected growers into an increasingly difficult financial bind as each year builds upon previous losses.
- ➡ The Massachusetts cranberry industry is comprised of diverse farm sizes and situations. The vast majority of growers have small to medium-sized operations. Accordingly, they also have limited financial resources and alternatives for dealing with the deepening industry crisis.

This briefing goes on to state that the current crisis places at risk:

- 62,000 acres of open space (15,000 acres of bogs and 47,000 acres of supporting lands and watershed),
- over 3,500 jobs directly associated with the industry
- approximately \$90 million in food processing shipments in Plymouth County
- approximately \$145 million in agricultural production from cranberries
- plus the environmental, quality of life and economic multiplier effects of losing a significant portion of the Massachusetts cranberry industry.

Current predictions are for cranberry prices to continue to be depressed (below production costs) for at least 2 more years and likely never to recover to levels enjoyed in the past. In fact, future prices may never exceed by more than a small margin the cost of production which is relatively high in the Commonwealth compared to other states, especially Wisconsin.

The greatest risk associated with this crisis, aside from the impact on the livelihoods of the cranberry growers themselves, is the potential loss of land, open space, to commercial and/or residential development. The land owned by the growers, especially the supporting uplands, is their single largest source of equity to tap into to recover accumulated losses. Selling land is a one-shot option. Once sold, the land will likely never return to

agricultural use or remain as open space. It offers a short term single infusion of capital that allows growers to reorganize their operations or pursue alternative livelihoods.

## **Background – Dayneutral Strawberries**

**Strawberries:** Strawberries are a high-value crop that grow well in our climate. We have about 500 acres of commercial strawberry production in Massachusetts, which represents about \$5 million in retail sales (mostly PYO and roadside stands). The market for traditional June-bearing strawberries is likely saturated and adding acreage to this would surpass the demand and depress the price. However, there is a market window for strawberries later in the summer (August - October) that is currently filled from non-local sources and represents a high-priced niche of \$3 - \$4/**pint** retail. This is more than triple the June price, which ranges from \$1.50 - \$3.50/**quart** retail. Even the wholesale price for these late summer strawberries is estimated at \$1.75, more than double the price for June-berries. The most profitable markets for these late season berries are restaurants and urban farmer's markets, both of which are accessible to growers in eastern counties. Roadside stands are also good outlets for this fruit.

Strawberries can be produced locally for this market window in two ways, 1) by growing dayneutral strawberry varieties, or 2) by using a system that manipulates the flowering time by holding plants in cold storage and bringing them out at delayed intervals. This latter system is used extensively in Europe and being tried in Canada and is called the 'waiting bed system'. Of these two systems, the most promising at this time is the use of dayneutral varieties. Researchers feel that the cost of plant production for the waiting bed system is too high to make the system profitable in North America, at present<sup>1</sup>. (If some of these production cost barriers can be overcome, the waiting bed system becomes more attractive than the dayneutral system because of the superior fruit characteristics of the varieties that can be used.)

Dayneutral strawberries are different from conventional June-bearing strawberries because they will initiate flower buds independently from day length. June-bearing strawberries initiate flower buds only during the short-day photoperiods of late fall and early spring. This is why they require planting the year prior to fruiting. Flower buds of June-bearing strawberries are initiated more or less all at the same time, which means that the fruit is matured all at the same time (within 14 days) for a given variety. With the dayneutral varieties, flowers are initiated continuously during the growing season. If flowers are picked off during the early part of the growing season, fruit maturation and ripening and the bulk of yield can be delayed until the latter part of the summer. This coincides with higher market prices at that time of year. Furthermore, this system can be established, matured, and harvested within a single growing season. This annual production system offers two key benefits, 1) land planted with strawberries brings returns in the same year, 2) it is not necessary to over-winter the plants thereby reducing inputs of labor and materials (straw). Even with the higher investment in plants for an annual system, the projected revenues are comparable as shown below<sup>2</sup>.

**Table 1.** Yield and profit summary for 2 years of annual and perennial production of dayneutral strawberries.

	<b>Yield per Acre Year 1 (lbs)</b>	<b>Profit per Acre Year 1*</b>	<b>Yield per Acre Year 2 (lbs)</b>	<b>Profit per Acre Year 2**</b>	<b>Cumulative Profit***</b>
<b>Perennial System</b>	12,000	\$8,825/acre	16,000****	\$8,837/acre	\$17,662/acre
<b>Annual System</b>	12,000	\$7,965/acre	12,000	\$9,240/acre	\$17,205/acre
<b>Difference</b>	0	-\$860/acre	-4,000	\$403/acre	-\$457/acre

\*returns minus production costs and pre-plant site preparation costs

\*\* returns minus production costs

\*\*\* sum of year 1 and year 2 profits

\*\*\*\* the second year production in the perennial system yields a high proportion of fruit in June when the prices are low.

<sup>1</sup> Sullivan, J. A., 1991, Challenges for Waiting Bed Production Systems. Proceedings of the IV North American Strawberry Conference. Pp. 171 – 175; Dr. Adam Dale, Univ. of Guelph/Simcoe, pers. comm.

<sup>2</sup> Pritts, M. P. and A. Dale. 1989. Dayneutral Strawberry Production Guide. Cornell Informational Bulletin 215.

These figures reflect profit above costs and reflect a conservative assumption of receiving only \$1.74/pint in the annual system and an average of \$1.46/pint in the perennial system. Higher prices may in fact be reasonable assumptions given the stated retail market price of \$3 - \$4 per pint. Full details of this system can be found in the appendices in the document entitled, "Dayneutral Strawberry Production Guide" by Cornell Cooperative Extension.

The environmental benefits of this cropping system flow mostly from the economic benefits. That is, by providing a viable, sustainable, and profitable alternative or supplemental crop to cranberry growers, it may be possible to prevent the liquidation of some land assets to commercial or residential development. Additionally, the environmental impact of the annual dayneutral cropping system itself are relatively low. Fungicide applications are minimal because flowering takes place during a normally dry time of year. Fertilizer is applied through the drip irrigation directly to the root zone of the plants and subject to little or no leaching. Insecticide applications for management of tarnished plant bug are likely to be the most significant pesticide input at about 3-4 applications per cropping year. Biological controls and visual traps are also available technologies.

### **Project Objective and Accomplishments**

- ◆ The objective of this project was to locate 4 sites; 2 bogs for conversion and 2 upland sites associated with bogs to use for the establishment of an annual dayneutral variety trial.
  - We succeeded in finding 3 planting sites; 2 upland locations and 1 bog. We encountered difficulty in locating bog sites because of the unexpected costliness of stripping off the cranberry vines.
  - Unfortunately, the one bog site we planted was devastated repeatedly by deer browsing and was abandoned.
  - The two upland sites were located at the same bog location, were planted with 4 varieties and were maintained through mid-September. The grower plans to overwinter the plantings and fruit them again in 2003.

### **Project Results**

Fruit was harvested regularly (2-3 times per week) and yield recorded according to fruit quality (#1 marketable, #2 processing fruit, #3 unmarketable) from July 26, 2002 to Sept. 16, 2002 when the field experienced a killing frost. If frost protection measures had been used (irrigation or row covers), another week or more of picking might have been accomplished. 'Seascape' produced the most constantly high quality fruit while 'Tristar' had the highest overall yield. Weather conditions were not very favorable for fruit production during the summer of this project. Field temperatures were above 90°F for significant periods, which reduces the plants' ability to form and ripen fruit. For these and other reasons (compacted soil, late planting, need for better fertilization program), yields were significantly lower than expected. It is our belief that higher yields are achievable.

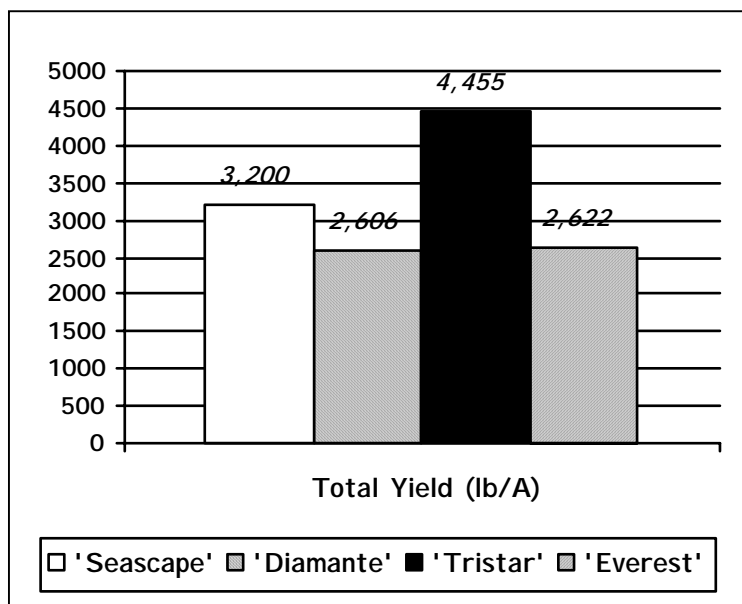
**Table 2.** Harvest results (in pints) of 4 varieties of dayneutral strawberries on a small planting.

Varieties	#1 Marketable Fruit	#2 Processing Fruit	#3 Unmarketable Fruit
'Seascape'	53.31	18.00	8.63
'Diamante'	39.29	15.38	10.50
'Tristar'	72.78	24.72	13.88
'Everest'	35.91	14.66	15.00

Fruit was sold fresh at a small roadside stand for \$2/pt without any advertising or marketing effort. All fruit that was harvested was sold.

If further work is done on this production system, better site preparation, earlier planting, improved fertilization program and other management practices will improve the overall yield.

**Figure 1.** Harvest totals (lbs/acre) of marketable fruit for 4 dayneutral strawberry varieties.



### **Grower Outreach:**

**CCCGA Annual Meeting:** A poster session was held at the Cape Cod Cranberry Growers' Association Annual meeting on August 20, 2002. Over 500 growers attend the session. Key personnel field questions and provided demonstration of actual fruit for participants.

**Cranberry Station Winter Meeting:** Over 270 growers attended the Cranberry Station winter meeting where Sonia Schloemann presented the results of the project and distributed a grower's guide. Schloemann then sat on a panel with other presenters to field questions on diversification options.

**UMass-Dartmouth Cranberry Symposium:** Poster presentation at UMass-Dartmouth, February 21, 2003

**Cranberry Station Newsletter and Small Fruits Website:** Articles about the project were published in the Cranberry station February 2003 newsletter (cir. 325 growers). Small fruits Website [www.umass.edu/fruitadvisor](http://www.umass.edu/fruitadvisor) contains the pdf of the guidelines.

### **Key Personnel and Resources**

Below are listed the individuals who participated in this project and the capacity in which they served.

**Table 3.** Key Collaborators and resources for this project.

Key Collaborators	
➤ <b>UMass Extension</b> – Project planning and direction, labor and equipment	<i>Sonia Schloemann Hilary Sandler Michelle Botelho</i>
➤ <b>Massachusetts Dept. of Food and Agriculture</b> – Project funding support	<i>Susan Phinney, AgroEnvironmental Technology Program</i>
➤ <b>Cape Cod Cranberry Growers Association</b> – Project	<i>Jeffrey LaFleur, Executive Director</i>

administration	
➤ <b>Decas Cranberry Co.</b> – Project cooperator (land, facilities, equipment, labor)	<i>Dave Nolte and Mark Sherman</i>
➤ <b>Snipatuit Cranberry Bog</b> – Project cooperator (land, facilities, equipment, labor)	<i>Ben Bailey</i>
<b>Key Resources</b>	
➤ <b>Massachusetts Society for Promoting Agriculture</b>	Project funding support - \$3,700 <i>donation to build an Irrigation pumping filtration station)</i>
➤ <b>Nourse Farms, Inc.</b>	Plant Material, equipment donation and consulting
➤ <b>Charles W. Harris Co. Inc.</b>	Irrigation equipment and consulting
➤ <b>Ken-Bar, Inc.</b>	plastic mulch donation

### **Additional Resources Materials:**

- ➡ **New England Small Fruit Pest Management Guide**, UMass Extension Bookstore. 413-545-2717. \$8.50 (Online at [www.umass.edu/Fruitadvisor](http://www.umass.edu/Fruitadvisor))
- ➡ **Small Fruit Nursery Selection Guide** (to find sources for plant material), Available from Cornell University Resource Center at 607-255-2080. \$3.00 (Online at [www.hort.cornell.edu/nursery](http://www.hort.cornell.edu/nursery))
- ➡ **Dayneutral Strawberry Production**. Available from Cornell University Resource Center at 607-255-2080. \$2.90. Not available online.

**Dayneutral Strawberry Production**  
Final Budget Account of Expenditures

Category	Unit Rate	Grant Monies Number of Units	Total	Category	Matching Monies Unit Rate	Number of Units	Total
<b>Salaries and Wages</b>							
Plant Maintenance and Pest Scouting (Semi-skilled labor)	\$8/hr Fringe	40hrs/wk, 13 wks	\$4,160.00 \$58.00	Project Coordination UMass Extension Small Fruit Specialist	\$24/hour	120 hours	\$2,880
Harvesting	\$8/hr	3.5hours	\$28.00	Project Supervision UMass Cranberry IPM Specialist	\$24/hour	50 hours	\$1,200
Project Administration Executive Director Cape Cod Cranberry Growers' Association	\$40/hour	20 hours	\$800.00				
			<b>\$5,046</b>				<b>\$4,080</b>
<b>Supplies &amp; Materials</b>							
Soil Sampling	\$15	8	\$121	Powell Strawberry Planter – <i>rental</i> <i>donated</i>	\$65/day	2 days	\$130
Fertilizer/Lime	\$22/ton	6	\$132	Plastic Mulch Layer - <i>rental donated</i>	\$50/day	2 days	\$100
Plants	9.8¢ each	20,000	\$1,970	White on Black Embossed Plastic Mulch - donated	\$264/roll 4' x 6,000'	1 roll	\$264
University Supplies and Materials			\$300	Drip Irrigation pump and filtration station	Various (see invoice)	Various	\$2,877.50
				Harvest Supplies			
				1/2 pint pulp containers	\$28.63/case of 600	1 cases	\$28.63
				1/2 pint masters	76¢ each	50	\$38
Irrigation Supplies							
Trickle tape	\$135/roll	2 rolls	\$270				
			<b>\$2,793</b>				<b>\$3,438.13</b>
<b>Communications</b>							
				Photo documentation			
				film	\$5/roll	5 rolls	\$25
				processing	\$8/roll	5 rolls	\$40
				digitizing images	\$2.50 each	25	\$62.50
				laminated color copies	\$1.25 each	20	\$25
				Grower meetings (2)			
				Poster Preparation	\$2.5/person	65	\$163
							<b>\$315.5</b>
<b>Total:</b>			<b>\$7,839</b>				<b>\$7,833.63</b>